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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,730	09/22/2003	Hidetoshi Naruki	L8734.03102	6048

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EXAMINER	
WANG, QUAN ZHEN	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/666,730	Applicant(s) NARUKI ET AL.
	Examiner Quan-Zhen Wang	Art Unit 2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 13 June 2007.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-3,5,7 and 8 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-3,5,7 and 8 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 14, 2007 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan et al. (U.S. Patent US 6,504,634 B1) in view of Keller et al. (U.S. Patent US 6,690,888 B1) and further in view of Graves et al. (U.S. Patent Application Publication US 2002/0196506 A1).

Regarding claim 1, Chan discloses an optical wireless communication system (column 5 lines 55-64; note that nodes are interconnected with one another by optical communication links, it is preferable that said links are wireless communication links) comprising a transmitter (1004, Figure 18) and a receiver (1002, Figure 18), said

transmitter comprising a first optical transmitting means for transmitting a first optical signal having narrow directivity (column 21 lines 40-49 (narrow beam width signal narrow beam waist and a small divergence)), said receiver comprising a first optical receiving unit for receiving said first optical signal (column 5 lines 57-58 (nodes include one or more optical transmitters and receivers)) and converting said first optical signal into an electric signal (column 6 lines 10-11 (receivers use photodetectors)), a light-receiving level detecting unit for detecting a light-receiving level of said first optical signal received by said first optical receiving unit (column 6 lines 10-11 (receivers use photodetectors)); a second optical transmitting means for transmitting a second optical signal (1008, figure 18) which carries light-receiving level information of said first optical signal obtained by said light-receiving level detecting means (column 34 lines 44-48 (signal strength received by receiver can provide said signal strength information back to the transmitter)) and has directivity wider than that of said first optical signal (column 28 lines 14-16 (a second transmitter 1008 has a wider beam of divergence than the first transmitter)); and said transmitter further comprising: a second optical receiving means (1010, Figure 18)(column 27 lines 62-65 (a second optical transmitter and receiver pair are included at either end of the communication link to facilitate alignment of the optical components) including a plurality of light-receiving elements each having light-receiving capability for receiving said second optical signal at a level corresponding to a difference in direction between an optical axis of said receiver and an optical axis of " said transmitter (Figure 19) (column 30 lines 28-31. (quadrant detector with four quadrants)) (column 28 lines 24-26 (quadrant detector offers spatial information about

the received signal)); a drive means (column 10 lines 5-6 driving mechanics))(column 10 lines 39-44 (motor or other drive mechanism can be used to drive the gimbals)) for positioning said first optical transmitting means and said second optical receiving means by integrally shifting said first optical transmitting means and said second optical receiving means toward the direction of said receiver (column 11 lines 20-28 (pointing offset error is corrected by using drive means to correct for pointing error))(column 2 lines 13-19 (transceivers are fixed to a movable mount to facilitate pointing of a transceiver to another node in the network))(column 3 lines 25-28 (pointing of the transmitter can be adjusted)); a rough optical axis adjusting (column 27 47-50 (link acquisition)) unit which executes a rough optical axis adjustment by controlling said drive unit so as to substantially equalize the light-receiving levels by said plurality of light-receiving elements (columns 29-30 lines 57-67 and 1-5 (Chan explains that the received optical axis is moved until the optical axis is centered on the detector thereby equally distributing the optical beam on all four light-receiving elements))(column 37 lines 1-7 (the initial step of alignment is rough or course pointing)); and a fine optical axis adjusting means for executing a fine optical axis adjustment (column 27 lines 57-61 (higher degree of pointing precision))(column 37 lines 25-30 (transmitter begins scan which is at worst a 10 degree by 10 degree uncertainty field wherein transmit beam can be centered on detector)) by controlling said drive means based on the information of the light-receiving level contained in the second optical signal being received by said second optical receiving means, after the rough optical axis adjustment by said rough optical axis adjusting means is accomplished (column 37 lines 14-31 (coarse pointing

may not be enough to adequately acquire the transmitted signal, in this case finer adjusting is used))(column 35 lines 36-40 (if the received signal passes a threshold the transmitter is slewing in the correct direction to provide more accurate centering)) (Figure 26). However, Chan fails to disclose said fine optical axis adjusting means searches a relatively wide region when said light-receiving level information is relatively small, and said fine optical axis adjusting means searches a relatively narrow region when said light-receiving level information is relatively large. However, Keller, from the same field of endeavor discloses a method for establishing and maintaining optical open-air communications links (title) wherein when transmitted light crosses a receiver area such that the detected light experiences an increasing intensity, the search scanning area is decreased (columns 10-11 lines 56-67 and 1-23 (if the intensity of the light in the new detected light event is greater than the prior intensity during the last event, the search area is narrowed." Because Keller clearly teaches searching a relatively narrower region for a relatively higher optical level the claimed condition is met)). Therefore, it would have been obvious to one of ordinary skill in the art to implement the optical signal scanning method as taught by Keller in the optical scanning method as disclosed by Chan. The motivation for doing so would have been to decrease the amount of overall scanning time while also verifying that optical intensity is high enough for accurate data transmission (Keller: column 11 lines 1-6). The modified system of Chan and Keller further differs from the claimed invention in that Chan and Keller do not specifically disclose that the first optical transmitting unit is stopped until at least one of the light-receiving levels of the plurality of light-receiving elements of the

second optical receiving unit exceeds a predetermined value. However, Graves, from the same field of endeavor discloses an optical wireless communication system (atmospheric optical data transmission system (title)) a wherein transmitting said first optical signal by said first optical transmitting means is stopped until the light-receiving level of said plurality of light-receiving elements of said second optical receiving means exceeds a predetermined value (page 9 paragraph 57 (components intermittently transmit and receive the light waves. When one transceiver is transmitting the other transceiver is only receiving and vise versa)). Therefore it would have been obvious to implement the halting transmission as taught by Graves in the communication system as taught by Chan. The motivation for doing so would have been to allow for time to adjust said transmission for non-ideal pulses such as pulses blocked by adverse atmospheric conditions (Graves: page 1 paragraph 2 (dust, smoke, fog) (page 1 paragraph 4 (system is adaptive to atmospheric aberrations)) and to save on optical power usage.

Regarding claim 2, Chan in view of Keller discloses the optical wireless communication system in accordance with claim 1, wherein said plurality of light-receiving elements of said second optical receiving means are four photoelectric conversion elements arranged in a matrix pattern consisting of two lines and two rows in horizontal and vertical directions (column 11 lines 14-27 (quadrant PIN detector))(Figure 19 (two rows and two columns shown))(Figure 21 (two rows and two columns shown)), and said rough optical axis adjusting means executes the rough positioning of the optical axis in a total of eight directions based on the difference in the light-receiving

level of said four photoelectric conversion elements (column 11 lines 18-27 (quadrant detector generates an error signal which is used to drive azimuth and gimbal motors to correct for the error))(column 10 lines 30-45 (gimbal/azimuth motors allow for pointing bearings in a wide range of bearings, each node head is capable of rotating 370 degrees, other ranges are also permissible)).

With respect to claim 3, Chan in view of Keller discloses the optical wireless communication system in accordance with claim 1 (column 5 lines 55-64 (nodes are interconnected with one another by optical communication links, it is preferable that said links are wireless communication links)), wherein said fine optical axis adjusting means searches a region (column 37 lines 25-30 (scanning area has at worst a 10 by 10 degree uncertainty field)) wherein said light-receiving level information exceeds a predetermined value and executes the fine optical axis adjustment for the region identified by the search (column 37 lines 33-37 (once the corner cube is acquired, the beam can be directed to the receiver and the fine tuning can take place (wherein predetermined value is the value which allows for corner cube acquisition))).

Regarding claims 7-8, Chan further discloses that the fine optical axis adjusting unit (column 3, line 21 (fine tuning)) is adapted to execute the fine optical axis adjustment such that the light-receiving level of the first optical signal is maximized (column 3 lines 21-27 and 48-57 (optical axis can be adjusted to maximized (wherein a maximized optical communication signal is inherently above a communicable level) at the center of the spatial detector or minimized away from the center of the spatial detector)).

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chan et al. (U.S. Patent US 6,504,634 B1) in view of Keller et al. (U.S. Patent US 6,690,888 B1) and Graves et al. (U.S. Patent Application Publication US 2002/0196506 A1) and further in view of Ikeda et al. (U.S. Patent US 7,016,612).

Regarding claim 5, the modified system of Chan, Keller and Graves discloses the optical wireless communication system in accordance with claim 1 (column 5 lines 55-64 (nodes are interconnected with one another by optical communication links, it is preferable that said links are wireless communication links)). However, Chan, Keller and Graves fail to disclose said fine optical axis adjusting means estimates a distance to said receiver based on said light-receiving level information, and accomplishes said fine optical axis adjustment. Ikeda, from the same field of endeavor estimates a distance between counterpart assemblies based on light receiving level information (column 13 17-41 (reception light intensity of the optical communication device is inversely proportional to the square of the distance))(Figures 11 and 12) to perform fine optical axis adjustment (column 13 lines 37-41 (reception light intensity level is judged and emission intensity is then adjusted according to the communication distance)). Therefore, it would have been obvious to one of ordinary skill in the art to implement the distance measurement as disclosed by Ikeda in the modified system of Chan, Keller and Graves. The motivation for doing so would have been to create a more diverse optical axis alignment system that can compensate for a varying transmission distance.

Response to Arguments

5. Applicant's arguments filed one May 14, 2007 have been fully considered but they are not persuasive.

Applicant argues, "In a condition that none of the light-receiving levels received by the light-receiving elements exceeds a predetermined value, transmission of the first optical signal is stopped. On the other hand, in a condition that at least one of the light-receiving levels exceeds the predetermined value, transmission of the first optical signal is continued or restarted. Therefore, when a difference in direction of an optical axis between the receiver and the transmitter is large, the transmitter stops outputting the first optical signal, and when the difference is sufficiently small such that the transmitter is directed toward the receiver, the transmitter continues or restarts outputting the first optical signal to the receiver. Accordingly, the transmitter of claim 1 provides an advantage in that it can prevent the transmission light of the first optical signal from being emitted carelessly to the surroundings around the receiver. That is, the transmitter advantageously eliminates an adverse influence on peripheral devices or the environment (see specification page 11, lines 15-18). ... In this case, there is a probability that a first transceiver may carelessly emit an optical signal to peripheral devices, or the environment, other than a second transceiver that is planned to receive the signal. That is, the first transceiver adversely influences peripheral devices or the environment if the optical signal transmission is not stopped." However, the argued terminology is not reflected in the claims. In accordance with MPEP, "USPTO personnel are **to give claims their broadest reasonable interpretation** in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28

(Fed. Cir. 1997). **Limitations appearing in the specification but not recited in the claim should not be read into the claim**. E-Pass Techs., Inc. v. 3Com Corp., 343 F.3d 1364, 1369, 67 USPQ2d 1947, 1950 (Fed. Cir. 2003)" (MPEP §2106, emphasis added). For the instant case, claim 1 reads "...transmission of said first optical signal by said first optical transmitting unit is stopped until at least one of the light-receiving levels of said plurality of light-receiving elements of said second optical receiving unit exceeds a predetermined value". While graves also discloses that a wherein transmitting said first optical signal by said first optical transmitting means is stopped until the light-receiving level of said plurality of light-receiving elements of said second optical receiving means exceeds a predetermined value (page 9 paragraph 57 (components intermittently transmit and receive the light waves. When one transceiver is transmitting the other transceiver is only receiving and vise versa)). Therefore, the combination of Chan, Keller, and Graves still reads claim 1 with its "broadest reasonable interpretation".

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Agurok et al. (U.S. Patent US 6,369,925 B1) discloses to a beam combiner for a free space optical communication system, wherein the light source controller can cause the at least one of the at least two first light sources to stop emitting light based on detected optical intensity level (column 2, lines 60-63).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quan-Zhen Wang whose telephone number is (571) 272-3114. The examiner can normally be reached on 9:00 AM - 5:00 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

qzw
8/6/2007

Quanzhen Wang
Quan-Zhen Wang

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